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ABSTRACT

"How does a child come to be able to relate his own experience to the formal means of communicating about that experience in the language to which he is exposed?" The author maintains that the innate predispositions that underlie the development of the cognitive ability to organize and structure experience also underlie the acquisition of the structural systems for communicating about this experience, chief among which is language. Applying Piaget's and other psychologists' ideas concerning conceptual schemata and cognitive development, and Halliday's (1970) method for analyzing meaning in language to the taped utterances of seven children, the author notes patterns in the developing use of clause types by the children. The author suggests, having cited parallels between cognitive development and language development, that what is required is a detailed investigation of the strategies that children employ in their attempts to comprehend and convey the meaning intentions that are coded in speech. (VM)

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Learning to Code Experience through Language: An Approach to the Study of Language Acquisition.

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My purpose in this paper is to consider the way in which the child comes to mean or, to put it differently, the way in which he comes to be able to relate his own experience to the formal means of communicating about that experience in the language to which he is exposed. Might not the meaning that the child is able to intend play some part in determining the ways in which he achieves growing control over the formal means of expressing these meanings? In attempting to answer this question I shall suggest that the meaning intentions that are communicated through language can be seen as being drawn from three main areas: Inter-Personal Purpose, Topic and Presupposition. From amongst these, Topic will be selected for more detailed attention, and a proposal will be made for a set of Clause Types as the basic units of this aspect of meaning. I shall then explore the way in which these are matched to non-linguistic experience by examining speech data drawn from recordings of a group of children just learning to talk.

Language and Experience

How does a child come to mean? Exploration of this topic is made more difficult by the fact that, for us adults, language and experience are inextricably interwoven, and it is hardly possible to consider particular experiences except through the organizing framework that we use to talk about them. Yet if we can think of some particular personal experience that we find more than usually difficult to communicate to others, such as the precise nature of our feelings, we may get somewhat closer to the situation of the very young child. The point that I want to make is that the world of personal experience is shifting and private whilst the language we use to talk about it is made up of publicly agreed, discrete categories - phonemes, words, grammatical structures, - which are relatively constant across time and across individual speakers. Somehow the child has to make the relationship between personal experience and public means of expression and this, I take it, is largely what acquiring language is about.

The task is not made any easier by the fact that the correspondence between experience and linguistic expression is not perfect. At first sight the obvious

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strategy for the child to adopt would be to assume that a perceived difference between utterances had some counterpart in the world of experience and that different experiences would be expressed through different utterances. However he would find that this is not always the case. The following utterances illustrate some of the problems:

a. Burning coal can be dangerous.
b. The boy kicked the girl.
c. The girl was kicked by the boy.
d. The girl kicked the boy.
e. Will you bring a spoon for me?
f. Bring me a spoon please.
g. Where's my spoon?

Of these, (a) has two quite different meanings, (b) and (c) describe the same situation but with the order of mention of the participants reversed, whereas (c) describes the reverse situation of (d) although the order of mention of the participants remains the same; (e) (f) and (g) offer three quite different ways of expressing the same purpose - that of getting somebody else to bring a spoon. Any theory that attempts to explain how the child comes to be able to relate language and experience must be able to cope with this imperfect correspondence.

One explanation, put forward by Whorf (1956) and others, is that the language of the culture in which the child grow up provides him with a ready-made framework that enables him to structure and make sense of his experience, by dividing up the world along the lines laid down by the language system. Furthermore, since each language is unique in its structure, so must be the way in which each culture organizes the experience of its members. In its strong form, this theory sees language as preceding, and providing the structure for, the organization of experience.

Now whilst it is undoubtedly true that our habitual ways of thinking are largely determined by the language in which we communicate with those around us, there are three major objections to such an explanation of the relationship between language and experience. Firstly, the uniqueness of structure that Whorf drew attention to is now seen to be largely a surface phenomenon: at the deep, or semantic, level all languages draw on the same set of universal categories.

Secondly, our thinking is not completely bound by the forms of the particular language that we speak: it is possible to have thoughts which have no ready means of expression in our native language. Thirdly, if conceptualisation depends on language, and language itself has to be learned, it is difficult to see how the child equipped with neither language nor a conceptual framework would ever begin to learn at all since, on the one hand, the possession of one seems a necessary prerequisite for achieving the other, and, on the other, the surface structure of language carries no indication in itself as to how to break into the system. However, the fact that deaf children achieve an adequate level of mental functioning on a wide variety of tasks, despite being denied all access to linguistic communication,[2] makes it clear that, whatever the relationship between language and thinking, thinking cannot be dependent on language, at least initially.

An alternative explanation which might seem to meet this last objection, at least in part, is found in the theory of innate linguistic knowledge[3]. According to this theory, the child is biologically endowed with knowledge of the formal characteristics of human language and his task is to use this knowledge to form and test hypotheses about the particular language to which he is exposed. However, even if the child were able to discover in this way the generative principles of organization underlying the utterances to which he was exposed, he would still have to learn how these utterances were related to his own experience. So, although innate linguistic knowledge may be necessary for language acquisition, it certainly cannot be sufficient.

But is it even necessary? Whilst it is true that the acquisition of language, like the acquisition of all other forms of behaviour, must depend on very general innate predispositions, it does not follow that the child need be endowed with innate knowledge specific to the formal properties of language. Such a view seems to result from an approach which divorces language from the normal communication contexts in which it is used and acquired, and concentrates on the acquisition of the formal linguistic systems quite independently of the purposes for which they are acquired. If language acquisition is seen in its full context, it may only be necessary to posit a very general innate predisposition to develop increasingly more structured ways of interacting with the environment, provided that this environment includes meaningful instances of language in use.

What I wish to propose, therefore, is that, given a normal social environment and no impairment of physical and mental functioning, the innate predispositions that underlie the development of the cognitive ability to organize and structure experience also underlie the acquisition of the structured systems for communicating about this experience, chief amongst which is language. As Slobin (1970 p. 175) has recently put it.

"To a great extent the acquisition of grammar has, as a prerequisite, cognitive abilities which are involved in discerning the basic semantic categories of experience, for it is these categories and relations that are expressed in language. The underlying semantic-cognitive structure of human experience is universal, and these universals of structured experience seem to be expressed in strikingly similar fashion in child speech around the world". (my italics)

In this view, the universal characteristics of human language derive, not from innate knowledge, but from the universality of the cognitive structures that arise from interaction between the child and his environment. In order to give this claim greater precision it will be necessary to examine in more detail what Slobin refers to as the semantic-cognitive structure of experience and what I have referred to by the more general term 'meaning'. By putting his point in this way, Slobin stresses the Janus-like nature of meaning, at the interface between experience and language. On one side meaning is the structure we give to our experience; on the other side it is the formal organization of the content of language. Let us start, then, by examining the linguistic aspect of meaning as it is found in adult speech.

Meaning in Language

If we take, as a concrete example for discussion, the mother's reply in the following interchange, in which the child is looking for a toy train:

Child: Where's my train?
Mother. It's probably in your bedroom.

it is immediately apparent that it is simultaneously expressing meanings related to different areas of experience. Using the term 'function' instead of 'areas of meaning', Halliday (1970) has suggested that these can be grouped into three main categories, and in what follows I shall make use of his tripartite division.[4]

The first of these has to do with the social function of language: the interpersonal relationship between the participants, and the acts that utterances perform. In normal circumstances, speech is not an end in itself but, arising in a particular situation, it is one of the possible means of drawing others into the achievement of an end which exists independently of, and usually prior to, the act of speaking. Conversations are initiated to achieve a number of very general purposes such as the control of another's behaviour, the giving or obtaining of information and the expression of feeling and attitude; individual utterances occur within these larger plans as moves of particular kinds with Functions such as commanding, offering, refusing, stating, justifying, etc. As with other behavioural plans, conversation is thus hierarchically structured, with the individual utterance as the smallest unit of communication. At the level of utterance, too, are realised various other types of meaning which express the role of the speaker in the situation, such as his perception of his social status with respect to his listener, and his assessment of the veracity or certainty of his message.

Much more could be said about the range of interpersonal meanings from which particular options are selected, and about the way in which the child gradually builds up control of this repertoire. We shall touch on these later, but on this occasion I wish to concentrate on a different area of meaning, that which is concerned with the content of the plan for which a conversation is initiated, that is to say with Topic, and, at the level of the individual utterance, with what I have called Cognitive Content.

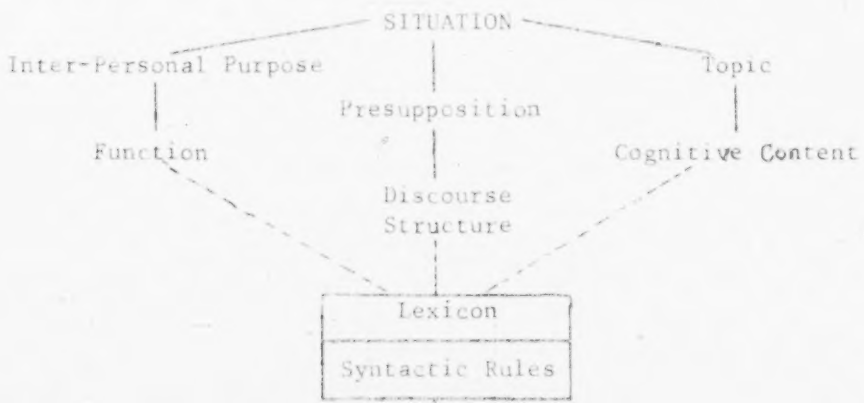
Before I do that, however, I should like briefly to mention the third area of meaning, that of Discourse Structure which organizes the message in terms of the speaker's presuppositions. As was suggested above, utterances normally occur as contributions to larger units of interaction that we can call conversational exchanges, and such exchanges are distinguished from random sequences of utterances by the chaining devices which link each utterance in various ways with what has gone before. One way of characterizing these links between utterances is in terms of what is taken for granted. The response to a question, for example, tends to provide just that piece of information that was signalled as being unknown in the previous question and usually takes for granted all the

information that was contained in the question. So, for example, the answer to the question "What have you bought for dinner?" would probably be "Fish fingers" rather than "I have bought Fish Fingers for dinner. As Rommetveit (1972) stresses, where the interlocutors know each other and share the same social world, elliptical speech is the norm rather than the exception.

Equally important in Discourse Structure is the speaker's assessment of which part of his message is most important, either in terms of what information is new and what has already been given, or in terms of contrastive emphasis. The given/new distinction is typically expressed in English through word order: Active as opposed to Passive Voice, or Marked as opposed to Unmarked surface arrangement (e.g. "What we need is a bottle opener" v "We need a bottle opener"); and contrastive emphasis typically through intonation (e.g. "I didn't leave the window open")

Very generally, then, this third area of meaning can be thought of as being concerned with the organization of the message in the light of the speaker's presuppositions about the attitudes and existing knowledge of the person he is addressing. It is the means of foregrounding new information and nesting it within a tacitly assumed shared social reality. In this way it is rather different from the other two areas of meaning in being concerned with the structure of the communication exchange rather than with its content. Since a wide range of experience of both people and language use is required for the development of this area of meaning, it is not surprising that it is not very much in evidence in the early stages of language acquisition.

To summarise the argument so far: language is seen as providing the means for expressing three main areas of meaning: Inter-Personal Purpose, Topic and Presupposition. An utterance will occur in some specific situation which will typically give rise to the selection of options from all these areas. Then, through the lexical and syntactic rules of the language, the particular configuration of meanings that has been selected will be realised in a unique surface form. The relationship can be diagrammed thus:



The Cognitive Content of Language

It is on the second area of meaning that I wish to concentrate in the rest of this paper, however - that of the Cognitive Content of utterances.[5] The world of experience can be thought of as consisting of a large number of entities, persons and things, that can be in a variety of states or relations to each other, in either static or changing modes. These entities are like participants in a drama who can take on different roles according to the type of scene in which they appear. Language represents these scenes in what I call Clause Types, a different clause type for each of the possible types of scene. At the centre of each clause type is the verbal element (realised in the surface structure of some clause types as an adjective in English) which expresses the state of the main participant or the relationship holding between two or more participants. The roles that participants can play are chosen from the following:

Agent The role of an animate being who causes a change of state in another participant (which may be co-referential with the Agent). This may also involve the use either of a physical object or of a body part as an instrument, or be by fiat, through the use of speech or social convention. Also the role of an animate being who carries out a Function. e.g. 'The postman delivered the letter'. 'Mary sang'.

Experiencer The role of animate being who can experience internal states and changes of state. e.g. 'The baby is happy'. 'The policeman saw the accident'.

Patient The role of a physical object, animate being treated as a physical object, event or mental representation of any of these, which can be in various states and located in space and time, and which can change in state and location. It may also be realised as a proposition or report. e.g. 'The waitress dropped the plate'. 'I want you to leave now'.

Instrument The role of a physical object, natural force, event or mental representation of any of these which serves as the immediate cause of a change of state or location in another participant. It may also be realised as a proposition or report. e.g. 'The hurricane blew the roof off'. 'He cut the string with a knife'.

Locative The role of the Location of the Patient in space, either at rest or

at some point along a path e.g. 'The cake is on the plate'. 'The cat leapt onto the table'.

Possessor The role of the Location of the Patient, when this Location is an animate being with a sense of ownership or temporary control of the Patient. e.g. 'Mr. Brown has three cars The gangster surrendered his revolver'.

Benefactive The role of an animate being who receives the benefit of the Patient e.g. 'Wagner wrote Siegfried Idyll for his wife'.

Range The role of the patterned or conventional activity which results from or defines the Function of an Agent e.g. 'The children played Happy Families'. 'The competitors all had to sing an operatic aria'.

Each clause type selects from amongst the above roles those that are obligatory for a particular scene.

With a small number of exceptions, the set of cluase types can be seen as filling cells in a two-dimensional matrix, one dimension of which is concerned with the type of state or relationship and the other with the static or changing mode. Table 1 presents this matrix with illustrative examples, and Table 2 shows the sub-divisions within the Attributive and Experiential States. The clause types that do not fit within this matrix are concerned with the intrinsic functions of animate beings and of certain inanimate objects (also shown in Table 2).

Of the basic states and relations, the one that is communicated about most frequently, at least by the families in our sample, is the locative relation, and this is matched by the variety of sub-types that occur within it. Whilst there is only one static locative relationship (discounting the precise oreientation of the participants to each other, e.g. 'on, 'in', 'under', etc.), as soon as there is a changing relationship between the participants we can distinguish five major sub-types. These are presented, with examples, in Table 3.

The clause types that have just been discussed represent only the basic scenes in which the participants can appear, finer distinctions are made by various types of modification on the clause, such as time, aspect, modality, manner, etc., and by the selection of the particular lexical items for each of the participants. This being so, one would expect children to acquire at least

States or Relations

Mode	Existence	Equative	Attributive	Experiential	Locative	Possessive	Benefactive
Static	There are unicorns	Herbert is the President	The thread is long	Eustace was sad	The cork is in the bottle	Penelope has two pennies	The party is for Herbert
Change of State	I was born	Herbert became President	The thread stretched	Eustace grew more and more sad	The cork is coming out of the bottle	Penelope has found a penny	
Agent Cause Change of State	The King declared war	The people elected Herbert President	Miranda broke the thread	Miranda cheered Eustace up	Herbert took the cork out of the bottle	Penelope was given a penny by her father	
Instrument Cause Change of State	The death of the King caused a war of succes-sion to break out	The computer elected Herbert President	The scissors cut the thread	The letter cheered Eustace up	The champagne forced the cork out of the bottle	The loss of her purse left Penelope without a penny	
Agent Cause Change of State by means of Instrument	John made a hole with his finger	The Queen knighted Herbert with a sword	Miranda cut the thread with a pair of scissors	Miranda cheered Eustace up by writing him a letter	Herbert used a corkscrew to get the cork out of the bottle		

Table 1. Examples of Main Clause Types

Attributive State

Physical	Quantity	Class	Evaluative	Substance	Dispositional
The thread is long	There are a dozen apples	This poem is a sonnet	The plan is excellent	The boat is made of glass fibre	Mr. Brown is generous

Experiential State

Physical	Affective	Cognitive (perceptual)	Cognitive (mental)	Wanting
Miranda is tired	Miranda is happy	Eustace can see Miranda	Herbert knows the answer	Eustace wants Miranda to talk to him

Functions

Agent Function	Patient Function	Agent Function on Patient	Agent Function over Range
Herbert is whistling	The bell rang	The baby drank its milk	The old ladies are playing bridge

Table 2. Attributive and Experiential States and Functions

Table 3. Sub-Categories of Locative Clauses

	Movement	Directional	Directional Movement	Target	Directional Target
Static	The boulder is on the lawn John is sitting in the chair The houses stood well back from the road			We live in Bristol Mary is wearing a necklace This bottle contains one pint	
Change	The boulder moved. The ball bounced.	The boulder fell into the ravine. The ball crossed the base-line.	The boulder rolled into the ravine. The ball bounced across the line		
Agent Cause Change	John moved the boulder. Mary bounced the ball.	John threw the boulder into the ravine. Mary picked up the ball.	John rolled the boulder into the ravine. Mary bounced the ball across the line.	John hit his brother. Bill kicked the ball. The mother tickled her baby.	John pushed his brother into the river. Bill kicked the ball over the wall.
Instrument Cause Change	The flood moved the boulder. The testing machine bounced the ball.	The crane picked up the boulder. The racquet sent the ball into the net.	The flood rolled the boulder into the ravine. The racquet bounced the ball over the net.	The lorry bashed the car.	The lorry bashed the car into the ditch.
Agent with Instrument Cause Change	John moved the boulder with a pick. Mary bounced the ball with a racquet.	John picked up the boulder with a crane. Mary got the ball out of the tree with her racquet.	John rolled the boulder into the ravine with a pick. Mary bounched the ball over the net with her racquet.	John hit his brother with a club. The mother tickled her baby with a feather.	John pulled the cork out of the bottle with a corkscrew. Bill hit the ball over the wall with his racquet.
Agent Cause Coreferential Change	John moved. Mary is dancing.	John went to the station. Mary remained at home. Our friends have arrived.	John walked to the station. Mary danced round the room. The birds flew away.		
Agent Instrument Cause Coreferential Change.	Mary is skating. John is swinging on a rope.	Mary travelled to London by train. John crossed the Atlantic in a boat.	Mary drove to London. John used a rope to swing across the ravine.		

some of the major distinctions between clause types before they began to acquire the various types of modification. Data from other studies of the acquisition of syntax give general support to this expectation, but a detailed examination of the topic still remains to be carried out.

If we return to the mother's reply that we took as an example at the beginning of the previous section, we can now describe the different types of meaning that she intended to communicate. With respect to Inter-Personal Purpose, firstly she chose to comply with the plan that the child was pursuing, that of finding his train, instead of ignoring his question or proposing a different plan, such as his finding the train for himself; secondly she responded with an utterance of which the Function was to give the desired information rather than, for example, asking why he wanted to know or explaining why she couldn't be expected to know. Finally she qualified her message with an expression of uncertainty. With respect to Topic, the Cognitive Content of her reply concerned a static locative relationship between two participants, 'the train' and 'the bedroom' and this relationship was qualified as occurring in the present. With respect to Presupposition, the mother assumed the existence of a shared topic of discourse and substituted the anaphoric pronoun 'it' for 'the train'; she also assumed that it would be obvious to the child in which of the possible bedrooms in the house he would find his toy.

Meaning and Experience

Turning now to the other face of meaning, we can ask about the way in which the child's experience is organized at the pre-linguistic stage. Of course it is not possible to answer this question directly, but we can make fairly satisfactory estimates by observing the child's behaviour. It is on the basis of such detailed observation that Piaget and his colleagues have arrived at their account of cognitive development which, although incomplete, is the most coherent general outline currently available. As my purpose here is to investigate the development of the relationship between language and experience, I shall not discuss Piaget's theory as a whole, but simply concentrate on his account of the content of the earliest stage of cognitive development, that of sensori-motor intelligence.

According to Piaget, this stage is normally completed by about the age of 18 months, which is also about the age at which language proper, that is to say utterances of two or more words together is normally first observed. He summarises the end-state of the sensori-motor stage of development as follows (Piaget and

"In the course of the first 18 months, there occurs a kind of Copernican revolution whereby the child eventually comes to regard himself as an object among others in a universe that is made up of permanent objects (that is, structured in a spatio-temporal manner) and in which there is at work a causality that is both localized in space and objectified in things"

There are a number of points in this summary which are significant with regard to the linguistic organization of meaning which was presented earlier. Firstly, emergence of the child into the awareness of the distinction between himself and the world outside himself. this is obviously a necessary prerequisite for the development of language, for until the child becomes aware of other people distinct from himself there is no requirement for communication, in language or in any other medium Secondly, we should note the precise form in which the child conceives the world he inhabits It is made up of permanent objects structured in a spatio-temporal manner These three notions of permanence, space and time must indeed come together, for to know that an object has a permanent existence is to know that it is in some place at the present moment, if not here where I am now, then in the place where I was at some previous time - unless some agency has caused it to move from that place And since objects do move, either by their own locomotion, or through the action of some other object, the child necessarily comes to grasp the notion of causality Piaget has given several examples of the forms of behaviour on which he bases the statement quoted above, but one will be sufficient to illustrate the sort of evidence he works from:

"Jacqueline throws a ball under a sofa But instead of bending down at once and searching for it on the floor, she looks at the place, realizes that the ball must have crossed under the sofa, and sets out to go behind it But there is a table at her right and the sofa is backed against a bed on her left; she therefore begins by turning her back on the place where the ball disappeared, goes around the table, and finally arrives behind the sofa at the right place. Thus she has closed the circle by an itinerary different from that of the object". (1952, p 339)

In this example, taken from his own daughter at the age of 18 months, all the notions discussed above are clearly displayed. the continued existence of the ball, its assumed present location as the result of its own movement from the location at which it was last seen, and Jacqueline s own self-caused movement to

come to the location of the ball. This particular event, it is worth noting, also requires the integration of all these notions, or action-schemata as Piaget calls them, into one concentrated action plan.

These, then, are the major conceptual schemata that are manifest in a child's behaviour at the age at which he begins to produce structured utterances. The question we now have to ask is whether the same conceptual schemata underlie their structured utterances. Previous attempts to make such a comparison (e.g. Sinclair, 1969a) have been hampered by the lack of correspondence between the categories used in the description of sensori-motor development and the categories employed in the transformational theoreists' dominantly syntactic description of language. However, if language is described primarily in terms of its meaning structure, it is immediately apparent that there is a large measure of correspondence between the description just outlined of the Cognitive Content of utterances and the cognitive schemata that an 18 month old child uses to organize his experience. We can therefore set up a rather more precise hypothesis about the relationship between early language and cognitive development, namely that children's early utterances will express those meanings that correspond to the cognitive schemata that they have acquired by this stage.

Examination of samples of children's speech

In order to test this hypothesis, the transcripts of recordings of seven children were analysed according to the description of linguistic meaning presented earlier. The children formed part of the sample studied in a pilot study for the much larger longitudinal survey of language development currently being carried out in Bristol. The recordings were made in the homes of the children by means of a radio-microphone linked to a battery-operated tape recorder, controlled by a pre-set programme to switch on for short periods at intervals over a whole day. This technique makes it possible to collect samples of spontaneous speech which reflect the child's natural interaction with his environment, uncontaminated by the presence of an observer. Contextual information was obtained by replaying the tape to the mother in the evening of the same day and asking questions about the locae, participants and activity in each recorded period. Three recordings were selected from each child, made at 17 months, 22 months and 27 months in each case (the first recording of one child was unavailable at the time the analysis was made and so has had to be omitted), and the Mean Utterance Length in morphemes calculated for each. The recordings were then ranked in ascending order of M U L

and a count made of the frequency of occurrence of the different clause types in each recording.

A number of qualifications must be made before we attemtpt to interpret the results. The first is that, as the speech sample on which this analysis was carried out was time-based, the actual number of utterances varied from one recording to another, in part reflecting the relative garrulity or taciturnity of individual children and in part the particular events or activities in which the child happened to be engaged during the day on which the recording was made. Allied to this is the discrepancy between different clause types in terms of their expected proportional frequency - about which very little is known, either for children or for adults. Obviously, a recording containing relatively fewer utterances is less likely than a fuller recording to contain instances of the less frequently occurring clause types.

The second major qualification has to do with the ascription of utterances to particular clause types. Early utterances are renowned for their 'telegraphic' quality and indeed, in some cases, for the omission of some of the semantic information that is necessary for them to make sense at all. In context, however, such incomplete (by adult standards) utterances are usually quite clear, as the missing portions of the meaning are filled out by gestures or information that is taken for granted in the situation by both speaker and addressee. For example, the utterance "up" may seem meaningless when it occurs out of context, but when it is preceded by a cry from the child as the mother starts to go upstairs, leaving him downstaris, and is followed by the mother saying "Alright" as she returns and picks him up and takes him up with her, we can assign it with some confidence to the clause type Agent Cause Change of Location (Directional), as this is what the child is understood to intend.[6] Some utterances defy analysis, even when examined in context, and these have been omitted altogether; others may occasionally be ambiguous between one or more clause types, but such cases were rare in the recordings being considered here.

It may be objected at this point that it is not the child's intended meanings that are being analysed so much as the mother's interpretation of them. This is true, of course, but I would wish to argue that this is a strength rather than a weakness of the approach. Even when adult speech is the object of

study, the same question of interpretation arises, for in the last resort it is not possible to know the intended meaning of an utterance: the listener forms the best possible estimate on the basis of all the cues available - perceived speech signal, linguistic context, situation, etc. and responds, or interprets, on the basis of this estimate. Since interpretations are thus necessary, it can be argued that the mother is the person best equipped to make them, as not only does she know the child and his social world better than any outside observer, but she was also a participant in the situations in which the speech took place and was responding to the child in the light of all the available information at the time.

However it might still be argued that the meanings that an adult infers from the available cues differ systematically from those intended by the child, in virtue of the adult's mature knowledge of the language. It is certainly the case that a greater range of meanings - or 'meaning potential', as Halliday (1972) calls it - is available to the adult, but there does not seem to be any good reason to suppose that it is different in qualitative terms from that of the child, since meaningful communication is able to take place between children and adults from the earliest stages of language development through to adulthood without any serious discontinuities. Moreover, the child's development itself results, in part at least, from interaction with more mature speakers who provide the evidence on which the child builds his own system. There are idiosyncratic differences, largely in the meanings that individual lexical items have at different stages of development, but these do not seriously affect the more global meanings that are expressed through the various clause types, since the clause types are concerned with the relationships between roles such as Agent, Patient, Location, and not with the particular lexical items that realise the participant roles and, as we have already seen, there is independent evidence that the 18 month old child already shows that he utilises these basic relationships in organizing his actions. In sum, therefore, whilst there must be particular utterances where it is impossible to interpret the child's intended meaning, these are not so frequent as to call the whole approach in question.

Having made these necessary qualifications, we may now turn to the results of this preliminary investigation. These are presented in Table 4. The recordings are identified across the top by the name of the child, followed by his age at the time (I = 17 mths, II = 22 mths, III = 27 mths). The M U L of the recordings runs from 1.00 - 4.00 morphemes, and Brown's (1969) stages I - V have been superimposed

for comparison Clause types have been set out from top to bottom in the order in which they first occurred in the recordings as ranked by M U L The first entry, Unstructured has been used to cover two distinct types of utterance:

1 Utterances like 'Yes', 'Pardon', etc., which have no internal structure
2. Utterances, usually of only one word, where it is impossible to infer the intended meaning from the fragment actually spoken (This does not mean that such 'unstructured' utterances cannot in principle, be related to developing cognitive schemata, but that for these particular utterances there is insufficient evidence for a reliable interpretation to be made)

The first point to make about the results of the analysis is the decreasing incidence of these unstructured utterances with increasing utterance length. Calls for attention, one word positive and negative responses and requests for repetition constitute a sizeable though decreasing proportion of the total number of utterances at all stages, but whereas at the very beginning there are no utterances that can be confidently interpreted as realising a structured meaning that falls within the set of clause types, the proportion of utterances which can be so interpreted increases very rapidly as soon as the M U L exceeds 1 00 morphemes Not all such utterances consist of more than one morpheme, but the morphemes that are uttered clearly realise part of a structured meaning, as in the case of 'up' discussed earlier

The second most frequent category of utterances in the early stages, Operator + Nominal, requires some further explanation It will be recalled that the first major area of linguistic meaning that was considered concerned Inter-Personal Purpose Although this has not been explored in any detail in this paper, it plays an extremely important part in language acquisition and may well be the chief motivation for the child's embarkation on the task of learning to talk at all [7] Certainly it is this aspect of meaning which dominates in the Operator + Nominal utterances

In adult speech Inter-Personal Function and Cognitive Content are completely fused in the surface forms of utterances, although these two meaning components can be separated out in analysis Consider, for example, the following utterance:

"Would you mind passing the salt please?"

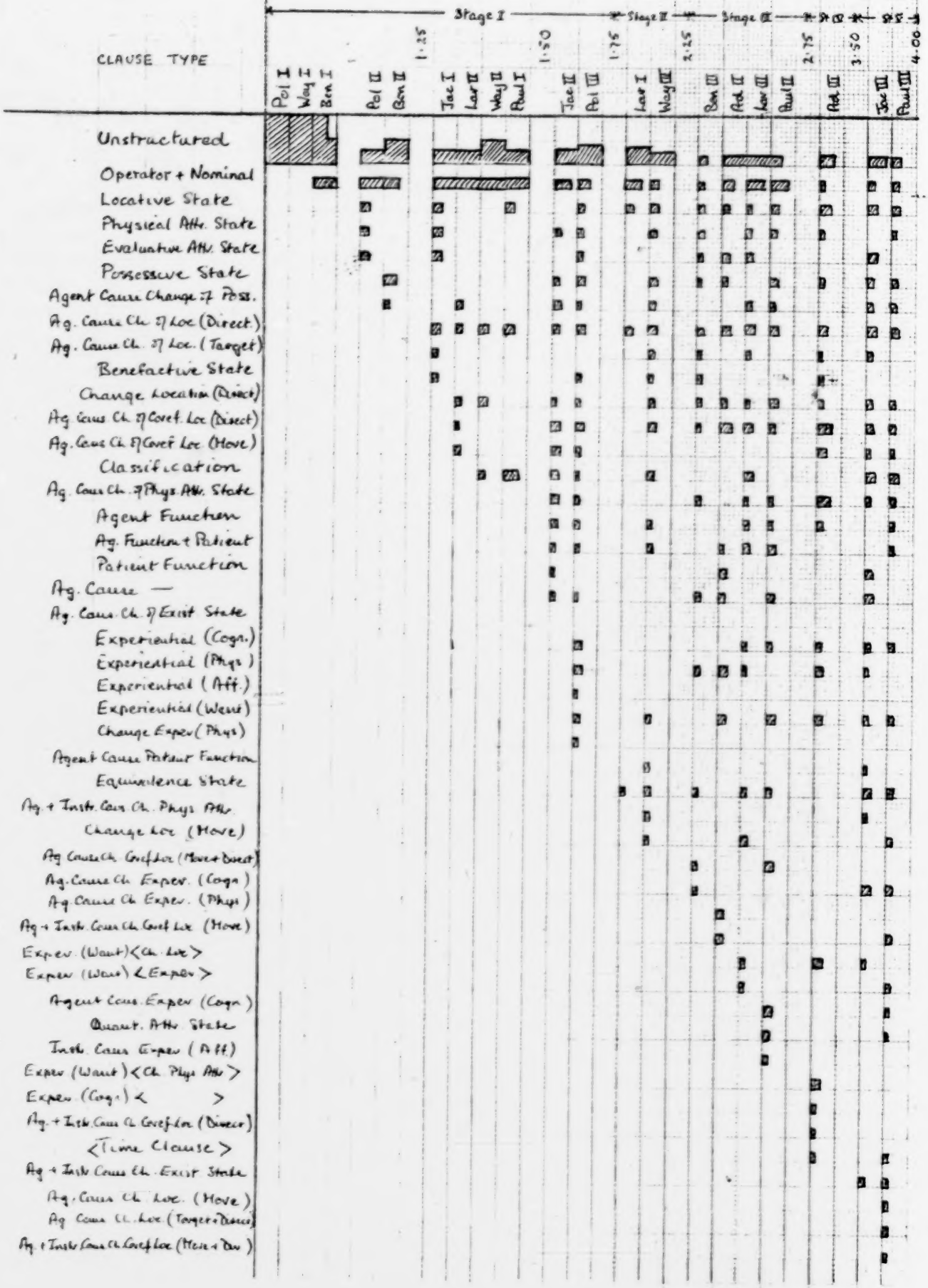


Table 4. Emergence of Clause Types by MUL.

Although the surface form of the utterance contains two clauses, one embedded within the other, omits all mention of the destination of the salt, and is Interrogative in mood, it will be interpreted as realising an instance of the clause type Agent Cause Change of Location (Directional)where Addressee is Agent, Speaker is Goal Location and the salt is Patient, and simultaneously as realising the Inter-Personal Function of Command to Addressee to act, with the addition of 'politeness' modifications.

Such complexity of relationship between meanings and surface form is, not surprisingly, beyond the infant noviciate. In the earliest stage, the two types of meaning are realised relatively independently in his utterances and it is only with increasing linguistic maturity that they begin to interpenetrate. In addition to calling for attention and accepting or rejecting adult ministrations, there are a number of other inter-personal functions that the infant's language serves to communicate. The most important of these we can call 'Instrumental' - the demand that his wants should be satisfied. Almost equally important is the 'Ostensive' function, by means of which the child shares his interest in the world around him. Every child we have studied so far has one or more means of signalling each of these functions. For example one child at first used the idiosyncratic morpheme' /$\tilde{3}$/ to signal that he wanted something and then later he used the morpheme 'more' when he wanted a recurrence or further portion of something, keeping /$\tilde{3}$/' for wants of a more general kind. The same child used the morpheme '/dʒə/ for the ostensive function, but other children have shown preferences for other 'morphemes' such as 'that', 'issa', 'see', etc.

Following the stage of exclusively unstructured utterances, the first structured utterances are largely concerned to realise these inter-personal functions with some attempt to specify the object or situation that is wanted or picked out for attention. Such utterances consist of one of the Instrumental or Ostensive morphemes plus a morpheme from the class of nominals. The recordings abound in utterances of this kind, such as '/$\tilde{3}$/ bena' (= want ribena), 'more record' (= play another record), '/dʒə/Mark' (Mark points to image of himself in a mirror), '/dæt pʌʃɪ /' (looking at a cat). The functional morpheme in these utterances can be thought of as an Operator signalling the inter-personal purpose of the speaker with respect to the object or situation which is referred to by the nominal morpheme.[8] Such utterances fit very well into the distributional pattern that has been described in the literature as 'Pivot-Open'[9] and because

all children seem to produce some utterances of this kind it is perhaps not surprising that the whole of early grammar was seen in these terms.

However, as Table 4 shows, such utterances form only a small proportion of the total, even in the period when M U L is less than two morphemes. Very quickly, children move on to utterances that are interpreted as containing more complex cognitive content, even though not all the conventionally required participants are realised in the surface form. So to concentrate on the surface form, in an attempt to describe the various combinations of Pivot and Open class words, completely misses the richness of the meanings that the children are attempting to communicate. Indeed as Lois Bloom[10] has shown, one surface form may, when considered as an act of communication in its full context, be seen to realise on different occasions two quite distinct meanings.

The first clause types to emerge are concerned with the physical attributes of objects, with evaluation of objects and with their location and possession. There is a slight tendency for static situations to be talked about before changing situations, with change of location and possession coming before change of physical attribute. Within the range of changing location, it is noticeable that directional change of location brought about by an external agency precedes the mention of directional change of location where Agent and Patient are co-referential, and of simple non-directional movement. Change of location or state, where the agent causing the change is specified, also precedes change without specification of the agent.

Two groups of clause types occur somewhat later when M U L reaches 1.5. The first of these concerns the functions of people or objects (such as playing, eating and making noises). At a somewhat later stage two children talk about an Agent causing a Patient to function, but this clause type occurs in the very restricted context of switching television on and off. The second group of clause types to appear are the Experiential clauses which concern the experiences of feeling, both physically and emotionally, of perception, and of wanting. It is interesting that these clause types should come together as a group, as they all depend on an awareness of subjective inner states and perceptions, in contrast to the clause types that have already been acquired, which were all concerned with states and relationships in the world outside.

The remainder of the period covered by our recordings sees the gradual filling out of the matrix of clause types concerned with location and physical attribution, particularly with the addition of Instrumental causation, the addition of Existential, Classification and Equivalence clauses, and with the simpler types of complex clause in which the role of Patient is realised by an embedded clause. By the stage at which M U L reaches 4.00 morphemes (Brown's Stage V), an impressive total of more than forty different clause types are being used.

Discussion of Results

Clearly it is going to be difficult to match this fine-grained analysis of the development of the meanings realised in speech with the relatively gross account of the types of cognitive schemata that have been acquired by the end of the sensori-motor stage of cognitive development. Piaget's first 'group structure' of schemata concerning spatial displacement depends on a growing understanding through action of the schemata of object permanency, spatial location and causation, in which each schema is intimately related to the others and none can be seen to take precedence. All these schemata receive linguistic realisation in the very early stage of structured speech, and so there is very general confirmation of the hypothesis under consideration. The ordering that emerges within the linguistic realisation of these schemata falls outside the current scope of Genevan developmental psychology, but it could well be suggestive of further lines of research within that framework.

The clause types concerned with the Functions of Agents and Patients are distinguished from those concerned with location and attributive states in that the events they describe do not involve a change, in the Patient, of either state or location. Nevertheless, if the schema of action without resulting change can be seen as a natural extension of action which does cause change, then the emergence of these clause types shortly after those concerned with causation would be satisfactorily accounted for.

The Experiential clauses pose more of a problem. Piagetian psychology has little to say about the shift in focus from the outer to the inner world that these clause types encode. In a very thorough discussion of the cognitive basis of early utterances along lines very similar to those presented here, Edwards (1972) has argued that those utterances occurring at the earliest stage which would normally

be said to realise Experiential Clause Types should not be taken as true Experiential clauses. Examing the instances that occur in Bloom's data he argues that, with the exception of those concerning 'want', all contain visual perception verbs. Morever "All", with the exception of 'see' are Agentive in adult grammar. That is, they do not refer merely to the passive process of an 'Experiencer' (as do 'hear', 'know', 'believe', etc.), but also to the action of an Agent. With 'look', Agent and Experiencer are the same person, while with 'show' they are different persons. In fact 'see' is often used Agentively too, as in the imperative 'see page 94', and 'see over there' - i.e. to direct somebody's attention to something". He goes on to argue that it is the object which is being attended to that is of interest to the child and not the process of visual experience, and so concludes that:

"... children's use of these verbs is limited to the "Relational" (i.e. locative) part of their meaning, and excludes the "Characterising" part which is concerned with the nature of the experience itself. There are no truly "experiential" verbs in early child language"

At the early stage of mainly two-word utterances that Edwards was discussing this seems to be a very plausible explanation. Indeed we have already noticed that the morphemes 'see' and 'look' are amongst those that act as Operators in the realisation of the Ostensive function. However, later utterances in our recordings containing the verbs 'watch' and 'show' are more difficult to account for in terms of a purely ostensive function, whilst in the following utterances the "characterising" part of the meaning which is concerned with the specifically visual nature of the process has almost certainly developed.

"I see him there" (Paul II)
"We see Smorky didn't we?") (Paul III)
"I want to see that toilet roll")

Perhaps the explanation of what happens is that 'see' and 'look' are originally imitated from adult utterances in ostensive situations and are first used as Ostensive operators. But because these words are also heard in situations which are concerned more with the process of perception than with the object perceived, the child's attention is directed to the Experience which they code. Nevertheless, if our hypothesis is correct, such a discovery of the experience involved in

seeing and looking could only arise from hearing these words used in appropriate situations, if the cognitive basis for understanding them in this way was already present, and this is a topic that does not yet seem to have been systematically investigated.

It is probably correct, therefore, to treat the early two-word utterances containing 'see' 'look' and 'want' as Operator + Nominal clauses and to reserve a description in terms of Experiential clause-types for those utterances that give evidence of what Edwards calls the "characterising" part of the meaning, such as those just quoted. However there is no doubt that Experiential clauses are expressed in the recordings being considered. Nor are they limited to clauses concerning visual perception, as the following examples demonstrate:

'Mental': "I thought I'd go to sleep" (Adam III)
"I wished fifty pennies" (Paul III)
'Affective': "I like it" (Paul II)
'Physical': "/ə/ hurt arm" (Adam II - as an excuse for not picking up toys)
"I've got an itch" (Lara III)
"I'm too hot" (Benjamin II)

However it is worth pointing out that the Experiential clauses quoted here all occur in the later recordings, when M U L has reached 2.25 morphemes and the grammar has developed well beyond the stage that Edwards was describing. By this stage too, the children are all aged 22 or 27 months and one would expect them to have made some additions to the original schema of sensori-motor intelligence, even though the detail of this subsequent development may still be unexplored. Presummably one of the prerequisites for the emergence of these experential clauses is some development of what has been referred to as "awareness of self" and "self-image"

The other major development in the cognitive content of the early utterances we are considering is the emergence of embedded clauses. It is significant that the majority of embedded clauses occur with 'wanting' in the superordinate clause. As we have seen, the Instrumental function is one of the first Inter-Personal Purposes to appear in child speech, being realised at first simply by a distinct type of phonation, and later by an Operator morpheme in relation to the name of the object wanted. However, if what is wanted is an action, this simple utterance will not suffice to encode the message adequately for, in addition to realising

the inter-personal function, the utterance must now also realise the relationship between the participants in the desired action, and subordinate the latter to the former, and this hierarchical relationship typically requires an embedded clause in its realisation. The model in cognitive functioning for the subordination of one unit to the status of constituent in a larger unit can already be seen in the child's behavioural plans. The description of Jacqueline's recovery of her ball, quoted from Piaget (p 13) is a good example. Embedding, then, is a strategy that could well be taken over from the hierarchical organisation of pre-linguistic actions and applied to the realisation of the meanings that encode such actions, in the same way as the relational meanings of the simple clause types are derived from the schemata that they encode.

Writing in 1969, Sinclair (1969b) stated the Genevan view on the relationship between language and experience as follows.-

> "a) that the infant brings to his language acquisition task not a set of innate linguistic universals, but innate cognitive functions which will ultimately result in universal structures of thought;
>
> b) that linguistic universals exist precisely <u>because</u> of the universal thought structures - and these are universal, not because they are inborn but because they are the necessary outcome of auto-regulatory factors and equilibration processes;
>
> c) that since intelligence exists phylogenetically and ontogenetically before language, and since the acquisition of linguistic structures is a cognitive activity, cognitive structures should be used to explain language acquisition rather than vice versa"

At that time, however, it was not very clear how the analysis of children's language could be related in any direct way to the pattern of cognitive development that they had elaborated. This paper offers a way of bridging the gap, through the analysis of meaning that has been presented. It also contributes evidence that bears upon the claims made in the above quotation, since the hypothesis to be tested is directly related to these claims. If we now attempt to assess the extent to which this hypothesis has been verified, it will be clear that, in broad outline, it has been substantiated, but that with respect to the finer detail it is inconclusive because of the lack of evidence at the present time concerning the finer points of cognitive development.

Although the results reported here may thus be taken to support the dependency of language acquisition on prior cognitive development, they still leave unanswered the question as to how the child discovers the way in which linguistic forms are matched to the meanings that he is capable of intending. In global terms it is clear that the very minimum that he requires to make this discovery is experience of language being used in, and about, the situations which he already understands. The ideal situation would be a shared activity with an adult in which the adult gave linguistic expression to just those meanings in the situation which the child already was capable of intending, and to which he was, at that particular moment, attending. And, of course, such situations do sometimes occur, from the naming of the object with which the child is playing to verbal comments on the child's experience such as

"Yes it's hot, and it burns you"

said by one mother in our study to her child two had just burnt himself slightly on an apparently harmless central heating radiator.

Learning situations are not always so clear-cut, however, and it will frequently happen that the child hears several different linguistic expressions in relation to the particular situation that he is engaged in, each focusing on different aspects of the situation. He will thus be faced with problems like those cited at the beginning of this paper (p. 2) and with yet other problems that are associated with words like 'and', 'or', 'because', that have no perceptual referents. I have argued in this paper that the child's undoubted success in overcoming these problems and in learning to match language with experience is the result of his having already developed a way of organising his prelinguistic experience along lines that will alert him to distinctions to look for in the utterances that he hears. Macnamara (1972) in a paper that forcefully puts a very similar point of view, seems to clinch the argument in the following discussion of the use of words like 'and' by 2 - 2½ year olds,

> "It is inconceivable that the hearing of a logical term should generate for the first time the appropriate logical operator in a child's mind. Indeed the only possibility of his learning such a word would seem to be if he experienced the need for it in his own thinking and looked for it in the linguistic usage about him" (p. 5)

But prior cognitive structuring of meaning associated with relevant experience of language in use is still not the whole answer, for language form, like

the experience it codes, has its own internal structure which has to be perceived, organised and stored. How the child succeeds in these tasks is still almost completely a mystery, although it is at least possible that the strategies that the child has developed to give meaning to his non-linguistic experience may, with the necessary adaptations, also prove sufficient for his linguistic experience. What is now required, therefore, is a detailed investigation of the strategies that children employ in their attempts to comprehend and convey the meaning intentions that are coded in speech. A start has been made in the investigations carried out by Bever (1970), Slobin (1973), Clark (1973) and Farnham-Diggory (1972); but most of the work still remains to be done

Notes

1. This paper is a revised and expanded version of a seminar paper that was given at the London School of Economics in February 1973. I am grateful for helpful comments on an earlier draft from Colin Fraser and Norman Freeman, and for assistance in the analysis of the speech samples from members of the Project staff. The work that is reported here is part of the 'Study of Language Development in Pre-School Children' that is being carried out in the University of Bristol School of Education with the help of a grant from the Social Science Research Council.

2. The functioning of deaf children on cognitive tasks is a subject that has been well reviewed by Hans Furth (1966). He found that although the deaf are inferior to hearing subjects on all tasks which are specifically verbal and on a few non-verbal tasks in which linguistic habits afford an advantage, they are certainly capable of carrying out tasks that require the sort of logical thinking that is often claimed to be impossible without language.

3. The best known proponents of this view are the transformational grammarians and those psycholinguists who have used the transformational model of language: Chomsky (1968), Lenneberg (1967), McNeill (1970).

4. A fuller account of the description of linguistic meaning that is presented here in summary can be found in Wells and Ferrier (1972) and in the coding manual prepared for the Bristol study referred to above (Wells, 1973).

5. The analysis of Cognitive Content proposed here takes its departure from Fillmore's 'Case Grammar' (Fillmore 1968). However, the clause-type, as the basic unit of analysis, is a new development.

It was prompted by dissatisfaction with Fillmore's 'case-arrays' for they can be ambiguous as to the relationship holding between the cases. For example, Agent + Patient would be the case array for all the following utterances:

a 'Harry painted the door'
b 'The baby drank the milk'
c 'John moved the stone'
d 'The chairman postponed the meeting'

Yet the relationship between Agent and Patient is different in each case: in (a) a change of physical state, in (b) a physiological function involving the

Patient, in (c) a change of location, and in (d) a change of time. The merit of the clause-type as the basic unit of analysis is that it captures the wholeness of the situation, which involves both the participants and the relationship between them.

The decision to carry out the analysis of Cognitive Content in this way was arrived at when Francesco Antinucci and I were visiting Dan Slobin and his colleagues at the University of California at Berkeley in the summer of 1972. The aim of the group was to produce a coding manual to be used in the investigation of language acquisition in a number of different languages (Antinucci et al 1972). The choice of an ergative model was dictated both by the possibility of relating a description of children's meaning intentions to Piagetian developmental psychology, and by the fact that it seemed to fit the range of data on child speech from a number of different languages better than any of the alternative models. In deciding on what meaning relations to recognize as constituting distinct clause types, and on the array of Participant roles that could occur within them, we attempted to keep to the minimum number of distinctions without grouping together states and events that were intuitively felt to be different.

Since that time, however, a number of developments have taken place in the different research centres, in particular the analysis of locatives that is presented here, with the result that, whilst the Bristol coding scheme is still very close in broad outline to the one in use at Berkeley, I must take the full responsibility for the version that has been used in the present analysis.

6 Patricia Greenfield and her colleagues (1972) have found that, given the full contextual information that is available to an observer on the spot, nearly all one-word utterances can be interpreted along lines similar to the analysis proposed here. Lois Bloom (in press), on the other hand, is more sceptical about interpreting one-word utterances as 'sentences' and argues that the child goes through several stages in his progress towards the acquisition of the grammar necessary for coding sentential meanings.

7 Halliday (1972) takes a specifically sociolinguistic approach to the explanation of language acquisition. He argues that, from the beginning, the child is learning, through a process of interaction with other human beings, to use language to do things in which others are essentially involved.

8. Not all the utterances in the recordings were addressed to others and most of the children produced some 'egocentric speech'. Such utterances, however, seem to be essentially derivative from the social use of similar utterances. As far as utterances with the Operator + Nominal structure are concerned, Ostensive utterances were far more common in the 'egocentric' situation than Instrumental; but both can occur in the sort of commentary that children often keep up on the situation that they are interested in, and on their own action in that situation.

9. For a full discussion of Pivot-Open grammar, see McNeill (1966)

10. Lois Bloom (1970) shows that, taken in context, the utterance 'Mummy sock' in one situation referred to the possessive relationship, and in another situation referred to Mother's action of putting the sock on the child.

11. Macnamara (1972), commenting on the occurrence in child speech of words referring to objects before those referring to attributes of objects, and of words referring to end states of actions before those referring to more permanent attributes, writes "If there is a differential set in small children to attend to varying states and activities rather than unvarying attributes, we need look no further for an explanation for the order in which the corresponding terms are learned.

A further hypothesis is that the child will not learn the name for states or activities until he has firmly grasped the name for at least some entities which exemplify such states and activities" (p.4)

Whether or not Macnamara's hypotheses are correct, it seems fairly clear that other factors influence the order of acquisition of clause types apart from the general pattern of cognitive development proposed by Piaget. In addition to the child's propensity to attend to varying attributes suggested by Macnamara, we might also consider the characteristics of the parent's speech to the child. how often are objects named as opposed to being referred to by pronouns? What sort of attributes are singled out for attention? Are they predominantly physical e g 'hot', 'red', 'heavy' or predominantly evaluative, e g 'nice', 'dirty', 'naughty'? It would be surprising if the frequency of occurrence of different types of meaning in parental speech did not have some influence on what the child attended to and sought to communicate about.

References

BEVER, T G — The Cognitive Basis for Linguistic Structures in Hayes, J R (ed) 'Cognition and the Development of Language' New York: Wiley, 1970

BLOOM, Lois M — Language Development. Form and Function in Emerging Grammars M I T 1970

BLOOM, Lois M — One Word at a Time. The Hague Mouton In Press

BROWN, R , CAZDEN, C and BELLUGI, U — The Child's Grammar From I to III In Hill, JP (ed) The Second Annual Minnesota Sympos. on Child Psychol University of Minnesota Press, 1969

CHOMSKY, N — Language and Mind New York: Harcourt, Brace & World, Inc. 1968

CLARK, Eve V — How Children Describe Time and Order In C A. Ferguson & D I Slobin (eds) 'Studies of Child Language Development' Holt Rinehart, 1973

EDWARDS, D — Sensory-Motor Intelligence and Semantic Intentions in Child Grammar Unpublished Paper, Graduate School in Arts & Social Studies, Univ of Sussex 1972

FARNHAM-DIGGORY, S — The Development of Equivalence Systems. In S Farnham-Diggory (ed) 'Information Processing in Children' New York: Academic Press, 1972

FILLMORE, C J — The Case for Case In E. Bach & R T Harms (eds) 'Universals in Linguistic Theory' Holt Rinehart, 1968

FURTH, H G — Thinking without Language. Psychological Implications of Deafness New York Free Press, 1966.

GREENFIELD, P et al — Communication and the Beginning of Language. The Development of Semantic Structure in One-Word Speech and Beyond. Working Draft, Harvard University, February 1972

HALLIDAY, M A K — Language Structure and Language Function In Lyons, J (ed) New Horizons in Linguistics Penguin 1970

HALLIDAY, M A K — Learning how to Mean To appear in Lenneberg E & Lenneberg Elisabeth (eds) 'Foundations of Language Development: A Multi-disciplinary Approach'

LENNEBERG, E H — Biological Foundations of Language. New York. Wiley, 1967.

MACNAMARA, J — Cognitive Basis of Language Learning in Infants. Psychological Review, 79, No 1 pp 1 - 13 1972

McNEILL, D — Developmental Psycholinguistics In Smith and Miller 'The Genesis of Language Mit Press, 1966

McNEILL, D — The Acquisition of Language Harper and Row. 1970.

PIAGET, J. The Origins of Intelligence in Children. International University Press, 1952.

PIAGET, J. & INHELDER. The Psychology of the Child. Routledge, 1969.

ROMMETVEIT, R. Deep Structure of Sentences Versus Message Structure. Norwegion Journal of Linguistics 26, 1. pp. 3 - 22. 1972.

SINCLAIR-DE-ZWART, H. A Possible Theory of Language Acquisition within the General Framework of Piaget's Developmental Theory. In Elkind, D. & Flavell, J. 'Studies in Cognitive Development' Oxford U. Press, 1969a.

SINCLAIR-DE-ZWART, H. Developmental Psycholinguistics. In Elkind, D. and Flavell, J. (eds) 'Studies in Cognitive Development. Oxford U. Press, 1969b.

SLOBIN, D.I. Universals of Grammatical Development in Children. In Flores d'Arcais G.B. & Levelt, W.M. (eds) 'Advances in Psycholinguistics'. Amsterdam: North Holland Publ. Co., 1970.

SLOBIN, D.I. Cognitive Prerequisites for the Development of Grammar. In Ferguson, C.A. & Slobin, D.I. 'Studies of Child Language Development'. Holt Rinehart, 1973.

WELLS, C.G. Coding Manual for the Description of Child Speech. University of Bristol School of Education, 1973.

WELLS, C.G. & FERRIER, L. A Framework for the Semantic Description of Child Speech in its Conversational Context. To appear in the proceeding of the International Symposium on First Language Acquisition held in Florence, Sept. 1972.

WHORF, B.J.L. Language Thought and Reality. (ed.) Carroll, J.B. MIT. Press, 1956.